

# COMPLETE LIST OF CURRENTLY AMENDED & PREVIOUSLY PRESENTED CLAIMS

1. (Currently Amended) A computer-implemented method for constructing and tangibly expressing a conic peak-point curve comprising:

- (i) selecting a start point,  $a_0$  on a computer image display of an implementing computer with a computer input device of the implementing computer;
- (ii) selecting an end point,  $a_1$  on the computer image display system with the computer input device;
- (iii) selecting a start tangent direction,  $e_0$  on the computer image display system with the computer input device;
- (iv) selecting an end tangent direction,  $e_1$  on the computer image display system with the computer input device, whereupon the computer image display system, responsive to the implementing computer, displays a centerline bisecting a chord between the start and end points  $a_0, a_1$ , extending through an intersection point  $r$  of rays extending in the start and end tangent directions  $e_0, e_1$  respectively from the start and end points  $a_0, a_1$ ;
- (v) selecting ~~[a distance of]~~ a peak point,  $p$ , on the centerline ~~[from the chord between the start and end points  $a_0, a_1$ , on the computer image display system with the computer input device]~~ where the peak point is a point on the curve that is farthest away from the chord between the start and end points  $a_0, a_1$ , ~~[lying on a centerline segment connecting the center of the chord with a intersection point  $r$  of rays extending in the start and end tangent directions  $e_0, e_1$  respectively from the start and end points  $a_0, a_1$ ]~~ whereupon the implementing computer, using any suitable mathematical formulae, constructs a conic peak-point curve passing through the start point  $a_0$ , the peak point  $p$ , and the end point  $a_1$ , with the start tangent direction  $e_0$  and the end tangent direction  $e_1$ ; and
- (vi) expressing tangibly the conic peak-point curve using any image display system controlled by the implementing computer.

2.(Previously Presented) A computer-implemented method for constructing and tangibly expressing a conic point-point curve comprising:

- (i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;
- 5 (ii) selecting a start tangent direction,  $e_0$  on the computer image display system with the computer input device;
- (iii) selecting a peak point,  $p$ , whereupon the computer image display system, responsive to the implementing computer, displays a guide area for locating possible end points loci defined by two rays intersecting at a point  $s$  that lies on one of two rays that extends from the start point  
10  $a_0$  in the direction of the peak point  $p$  at twice (2X) the distance of the peak point  $p$  from the start point  $a_0$ , the remaining ray extending from  $s$  in a direction opposite to the start tangent direction  $e_0$  ;
- (iv) selecting with the computer input device any point in the guide area displayed on the computer image display system as an end point  $a_1$  for a conic point-point curve, whereupon  
15 the implementing computer, using any suitable mathematical formulae constructs a conic point-point curve passing through the start point,  $a_0$ , peak point,  $p$ , and the end point  $a_1$  with the start tangent direction  $e_0$ , where an end tangent direction  $e_1$  is derived from a point of intersection of rays extending in the start and end tangent directions  $e_0$ ,  $e_1$ , which coincides with the intersection of a ray extending in the start tangent direction,  $e_0$  and a centerline  
20 extending through the center of a chord between the start and end points  $a_0$ ,  $a_1$ , and through the peak point,  $p$ ; and
- (v) expressing tangibly the constructed conic point-point curve using any image display system controlled by the implementing computer.

3. (Previously Presented) A computer-implemented method for constructing and tangibly expressing a conic point-tangent curve comprising

- (i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;
- (ii) selecting a start tangent direction,  $e_0$  on the computer image display system with the computer input device;
- (iii) selecting an end point,  $a_1$  on the computer image display system with the computer input device;
- (iv) selecting an end tangent direction,  $e_1$  on the computer image display system with the computer input device;
- (v) selecting a weight,  $w$  for the curve with a computer input device of the implementing computer, whereupon the implementing computer, using any suitable mathematical formulae, constructs a conic point-tangent curve passing through the start point,  $a_0$ , and the end point  $a_1$  with the start tangent direction  $e_0$  and the end tangent direction  $e_1$ , where a peak point  $p$  is calculated by the weight,  $w$ , which is a parameter defining a proportion between a distance,  $D_q$  of the peak point  $p$  from a center point,  $q$  of a chord between the start and end points  $a_0, a_1$  and a distance,  $D_r$  of the peak point  $p$  from an intersection point,  $r$  of rays extending in the start and end tangent directions  $e_0, e_1$  respectively from the start and end point  $a_0, a_1$ ; and
- (vi) expressing tangibly the constructed conic point-tangent curve using any image display system controlled by the implementing computer.

4. (Previously Presented) The method of claim 3 wherein the selected weight  $w$  is calculated from a fixed arbitrarily defined positive number  $v$ , multiplied by  $\cos(\alpha/2)$ , where  $\alpha$  is an angle between the start and end tangent directions  $e_0$ ,  $e_1$  extending from a common point, and the constructed curve converges to limit as  $\alpha$  approaches  $180^\circ$ .

5. (Previously Presented) A computer-implemented method for constructing and tangibly expressing a conic point curve comprising:

- (i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;
- (ii) selecting a start tangent direction,  $e_0$  on the computer image display system with the computer input device;
- (iii) selecting an end point,  $a_1$  on the computer image display system with the computer input device;
- (iv) selecting a weight,  $w$ , with a computer input device of the implementing computer, whereupon the implementing computer, using any suitable mathematical formulae, constructs a conic point curve passing through the start point  $a_0$  and the end point  $a_1$  with the start tangent direction  $e_0$ , where an end tangent direction  $e_1$  is set by pre-defined parameters selected with a computer input device, where a peak point  $p$  is calculated by the weight  $w$ , which is a parameter defining a proportion between a distance  $D_q$  of the peak point  $p$  from a center point  $q$  of a chord between the start and end points  $a_0$ ,  $a_1$ , and a distance  $D_r$  of the peak point  $p$  from an intersection point  $r$  of rays extending in the start and end tangent directions  $e_0$ ,  $e_1$  respectively from the start and end point  $a_0$ ,  $a_1$ ; and
- (v) expressing tangibly the constructed conic point curve using any image display system controlled by the implementing computer.

6. (Previously Presented) The method of claim 5 wherein the selected weight  $w$  is calculated from a fixed arbitrarily defined positive number  $v$ , multiplied by  $\cos(\alpha/2)$ , where  $\alpha$  is an angle between the start and end tangent directions  $c_0$ ,  $c_1$  extending from a common point, and the constructed curve converges to limit as  $\alpha$  approaches  $180^\circ$ .

5 7. (Previously Presented) A computer-implemented method for constructing and tangibly expressing a conic curvature curve comprising

- (i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;
- (ii) selecting a start tangent direction,  $c_0$  on the computer image display system with the computer  
10 input device, whereupon the implementing computer displays a guideline perpendicular to the start tangent direction,  $c_0$  on the computer image display system for a center  $m_0$  of a start curvature circle,  $r_0$ ;
- (iii) selecting a center  $m_0$  of the start curvature circle,  $r_0$  on the displayed guideline; and
- (iv) selecting an end point  $a_1$  on the computer image display system with the computer input  
15 device; and
- (v) selecting an end tangent direction,  $c_1$  on the computer image display system with the computer input device, whereupon the implementing computer, using any suitable mathematical formulac, constructs a conic curvature curve through the start point  $a_0$  and the end point  $a_1$ , with the start tangent direction  $c_0$  and the end tangent direction  $c_1$ , with the  
20 center  $m_0$  of the start curvature circle  $r_0$ , and a center  $m_1$  for an end curvature circle  $r_1$  is calculated; and
- (vi) expressing tangibly the constructed conic curvature curve using any image display system controlled by the implementing computer.

8. (Previously Presented) A computer-implemented method for constructing and tangibly expressing a class of point curvature curves including cubic Bezier curves and conics comprising:

(i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;

(ii) selecting a start tangent direction,  $e_0$  on the computer image display system with the computer input device, whereupon the implementing computer displays a guideline perpendicular to the start tangent direction,  $e_0$  for a center  $m_0$  of a start curvature circle  $r_0$  on the computer image display system;

(iii) selecting a center  $m_0$  of a start curvature circle  $r_0$  on the displayed guideline on the computer image display system with the computer input device;; and

(iv) selecting an end point  $a_1$  on the computer image display system with the computer input device, whereupon the implementing computer, using any suitable mathematical formulac, constructs a point curvature curve passing through the start point  $a_0$  and the end point  $a_1$ , with the start tangent direction  $e_0$  and the center  $m_0$  of the start curvature circle  $r_0$ , where an end tangent direction  $e_1$  is set by pre-defined parameters selected with a computer input device; and

(v) expressing tangibly the constructed point curvature curve using any image display system controlled by the implementing computer.

9. (Previously Presented) The method of claim 8 wherein the constructed curve is a conic and a center  $m_1$  of an end curvature circle  $r_1$  is thereby automatically determined.

10. (Previously Presented) The method of claim 8 wherein the constructed curve is a cubic Bezier curve, and a center  $m_1$  of the end curvature circle  $r_1$  is set by a defined parameter selected using a computer input device.

11. (Previously Presented) A computer-implemented method for constructing and tangibly expressing a Bezier point-tangent curve comprising:

- (i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;
- (ii) selecting a start tangent direction,  $e_0$  on the computer image display system with the computer input device;
- (iii) selecting an end point,  $a_1$  on the computer image display system with the computer input device;
- (iv) selecting an end tangent direction,  $c_1$  on the computer image display system with the computer input device;
- (v) selecting a weight,  $w$  with an input device of the implementing computer, whereupon the implementing computer, using any suitable mathematical formulae, constructs a Bezier point-tangent curve passing through the start point,  $a_0$ , and the end point  $a_1$  with the start tangent direction  $c_0$  and the end tangent direction  $c_1$ , having a peak point  $p$  calculated to lie on a centerline segment connecting a center point  $q$  of the chord between the start and end points  $a_0, a_1$  with an intersection point,  $r$  of rays extending in the start and end tangent directions  $c_0, c_1$  from the start and end point  $a_0, a_1$  respectively, the weight,  $w$  specifying a proportion between a distance,  $D_q$  of a peak point  $p$  from the center point  $q$  of a chord and a distance,  $D_r$  of the peak point  $p$  from the intersection point,  $r$  of the start and end tangents;
- (vi) expressing tangibly the constructed Bezier point-tangent curve using any image display system controlled by the implementing computer.

12. (Previously Presented) The method of claim 11 wherein the selected weight  $w$  is calculated from a fixed arbitrarily defined positive number  $v$ , multiplied by  $\cos(\alpha/2)$ , where  $\alpha$  is an angle between the

start and end tangent directions  $e_0$ ,  $e_1$  extending from a common point, and the constructed curve converges to limit as  $\alpha$  approaches  $180^\circ$ .

13. (Previously Presented) A computer-implemented method for constructing and tangibly expressing a Bezier point curve comprising:

- (i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;
- (ii) selecting a start tangent direction,  $e_0$  on the computer image display system with the computer input device;
- (iii) selecting an end point,  $a_1$  on the computer image display system with the computer input device;
- (iv) selecting a fixed weight,  $w$ , with an input device of the implementing computer, whereupon the implementing computer, using any suitable mathematical formulae, constructs a Bezier point curve passing through the start point  $a_0$  with the start tangent direction  $e_0$ , and the end point  $a_1$ , where an end tangent direction  $e_1$  is set by pre-defined parameters selected with an input device of the implementing computer, having a peak point  $p$  calculated to lie on a centerline segment connecting a center point  $q$  of the chord between the start and end points  $a_0$ ,  $a_1$  with an intersection point,  $r$  of rays extending in the start and end tangent directions  $e_0$ ,  $e_1$  from the start and end point  $a_0$ ,  $a_1$  respectively, the weight,  $w$  specifying a proportion between a distance,  $D_q$  of a peak point  $p$  from the center point  $q$  of a chord and a distance,  $D_r$  of the peak point  $p$  from the intersection point,  $r$  of the start and end tangents; and
- (v) expressing tangibly the constructed Bezier point curve using any image display system controlled by the implementing computer.



14. (Previously Presented) The method of claim 13 wherein the selected weight  $w$  is calculated from a fixed arbitrarily defined positive number  $v$ , multiplied by  $\cos(\alpha/2)$ , where  $\alpha$  is an angle between the start and end tangent directions  $e_0$ ,  $e_1$  extending from a common point, and the constructed curve converges to limit as  $\alpha$  approaches  $180^\circ$ .

15. (Previously Presented) A computer-implemented method for constructing and tangibly expressing a simple point-point curve comprising:

- (i) selecting a start point,  $a_0$  on a computer image display system of an implementing computer with a computer input device of the implementing computer;
- (ii) selecting a peak point,  $p$  on a computer image display system of an implementing computer with a computer input device, where the peak point is a point on the curve that is farthest away from the chord between the start and end points  $a_0$ ,  $a_1$ ;
- (iii) selecting an end point  $a_1$  on a computer image display system of an implementing computer with a computer input device;
- (iv) selecting a weight  $w$  for the curve with a computer input device of the implementing computer, whereupon the implementing computer, using any suitable mathematical formulae, constructs a simple point-point curve passing through the start point,  $a_0$ , the peak point,  $p$ , and the end point  $a_1$ , where, using the weight  $w$ , a point  $r$  is derived on a centerline extending from a center point,  $q$ , of a chord between the start and end points,  $a_0$ ,  $a_1$ , and through the peak point,  $p$ , establishing an intersection of rays extending through the start and end points,  $a_0$ ,  $a_1$ , setting start tangent and an end tangent directions,  $e_0$ ,  $e_1$ ; and
- (iv) expressing tangibly the constructed point-point curve using any image display system controlled by the implementing computer.